What is claimed is:

1. A proximity sensor mountable adjacent to an aperture of a metallic motor vehicle for determining the presence of an object in the path of or proximate to a closure panel that moves between a fully open position and a closed position, the sensor comprising:

first and second electrodes encased in a non-conductive casing mountable on the vehicle, the two electrodes defining a capacitance CE1/2 therebetween;

a reference capacitor (C1);

a first switch for selectively connecting the first electrode to the reference capacitor or to chassis ground;

a second switch for selectively connecting the second electrode to a first voltage reference source (V_{ref1}) or to chassis ground;

a controller for controlling the first and second switches in order to periodically charge the capacitance CE1/2 and transfer the charge stored thereon to the reference capacitor.

2. A proximity sensor according to claim 1, wherein the controller transfers charge from the capacitance CE1/2 to the reference capacitor for a fixed number of periods for each charge and discharge cycle of the reference capacitor.

3. A proximity sensor according to claim 2, wherein the controller measures the voltage level of the reference capacitor.

4. A proximity sensor according to claim 1, wherein the controller transfers charge from the capacitance CE1/2 to the reference capacitor for a variable number of periods for each charge and discharge cycle of the reference capacitor.

5. A proximity sensor according to claim 4, wherein the controller records the number of periods, N, required to transfer charge from capacitance CE1/2 to the reference capacitor until it reaches a voltage equal to a second voltage reference (V_{ref2}).

6. A proximity sensor according to claim 2, wherein the controller calculates the value of capacitance CE1/2 according to the following formula:

$$CE1/2 = (C1*V_{ref2})/(N*V_{ref1}).$$

7. A proximity sensor according to claim 1, wherein the reference capacitor (C1) forms part of a charge integrator circuit connectable to the first switch.

8. A proximity sensor according to claim 7, wherein the integrator circuit includes a switch controllable by said controller in order to dissipate charge from the reference capacitor (C1).

9. A proximity sensor according to claim 8, including a signal amplifier connected between the charge integrator circuit and the controller.

10. A proximity sensor mountable adjacent to an aperture of a metallic motor vehicle for determining the presence of an object in the path of or proximate to a closure panel that moves between a fully open position and a closed position, the sensor comprising:

first and second electrodes encased in a non-conductive casing mountable on the vehicle, the two electrodes defining a capacitance CE1/2 therebetween, a capacitance CE1 between the first electrode and chassis ground, and a capacitance CE2 between the second electrode and chassis ground;

a reference capacitor (C1);

a first switch for selectively connecting the first electrode to the reference capacitor or to chassis ground;

a second switch for selectively connecting the second electrode to a first voltage reference source (V_{ref1}) or to chassis ground;

circuitry for controlling the first and second switches in order to periodically charge the capacitance CE1/2 and transfer the charge stored thereon to the reference capacitor without transferring substantially any charge stored on the capacitances CE1 and CE2 to the reference capacitor.

11. An anti-pinch assembly for a closure device of a motor vehicle, said assembly comprising:

a closure panel, supported by the motor vehicle, and moveable between a fully open position and a closed position;

a controller operatively connected to the closure panel for controlling the operation thereof, said controller including a proximity sensor mountable adjacent to an aperture of the vehicle for determining the presence of an object in the path of the closure panel, the sensor comprising:

first and second electrodes encased in a non-conductive casing mountable on the vehicle, the two electrodes defining a capacitance CE1/2 therebetween; a reference capacitor (C1),

a first switch for selectively connecting the first electrode to the reference capacitor or to chassis ground,

a second switch for selectively connecting the second electrode to a first voltage reference source (V_{ref1}) or to chassis ground, and

circuitry for controlling the first and second switches in order to periodically charge the capacitance CE1/2 and transfer the charge stored thereon to the reference capacitor;

said sensor providing an obstruction signal to the controller for preventing the movement of the closure panel when an object is sensed in the closure path.

12. A method of sensing the presence of an object in the path of or proximate to a closure panel, mounted in a metallic structure that moves in an aperture between a fully open position and a closed position, the method including:

mounting first and second electrodes encased in a non-conductive casing on the structure near the closing edge of the aperture, whereby the two electrodes define a capacitance CE1/2 therebetween, a parasitic capacitance CE1 between the first electrode and chassis ground, and a parasitic capacitance CE2 between the second electrode and chassis ground;

provisioning a reference capacitor (C1);

cyclically connecting (a) the second electrode to a voltage reference source (V_{refl}) and the first electrode to a chassis ground and (b) the second electrode to chassis ground and the first electrode to the reference capacitor, thereby periodically charging the capacitance CE1/2 and transferring the charge stored thereon to the reference capacitor whilst short-circuiting the parasitic capacitances; and

comparing the charge on the reference capacitor, the time period required to charge the reference capacitor to a specified voltage, or a calculated value for CE1/2 against a reference value in order to derive an obstruction signal.

13. A sensing method according to claim 12, wherein the value of capacitance CE1/2 is calculated according to the following formula:

$$CE1/2 = (C1*V_{C1})/(N*V_{refl}),$$

wherein V_{C1} is the voltage on the reference capacitor.

14. A sensing method according to claim 12, wherein the reference capacitor (C1) forms part of a charge integrator circuit connectable to the first electrode.

15. A proximity sensor according to claim 14, wherein the integrator circuit includes a switch in order to periodically dissipate charge from the reference capacitor (C1).